The welfare of laying hens in conventional cages and alternative systems: first steps towards a quantitative comparison

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Abstract

Research synthesis, using techniques such as meta-analysis to combine the results of a number of studies, is a particularly useful technique when there are multiple studies with conflicting results, or where there may be conflicting interests, and can serve to extract the maximum information from animal experiments. The effect of conventional cages and alternative housing systems on measures of production, behaviour, physical and physiological condition in laying hens is an important question that would benefit from research synthesis. We found that statistical constraints did not allow the usual methods of meta-analysis, so as a first step towards quantitative comparison, we used a simple vote-counting approach based on the treatment means. We counted the number of papers in which conventional cages or alternative systems had a higher weighted mean for various response variables. Egg production was higher in conventional cages than in alternative systems, though this effect was probably mostly confined to the comparison with multi-level indoor systems. Bones were stronger from hens kept in alternative systems than those kept in conventional cages. We confirmed previous reviews that birds show more comfort behaviour and possibly dustbathing (or vacuum dustbathing) behaviour in alternative systems, but aggressive pecking did not differ between systems. Perhaps surprisingly, mortality, feather pecking and body wounds were not found to differ between systems. The latter findings suggest that the chance of a mortality or cannibalism outbreak may be no greater in alternative systems than in cage systems, but it should be noted that our analysis did not consider the magnitude of the difference in mortality. In conclusion, the meta-comparison undertaken here supports some but contradicts other conclusions reached in qualitative reviews.

Keywords: animal welfare, behaviour, cages, egg production, housing, laying hens

Introduction

Concern for the welfare of laying hens in conventional (battery) cages has probably attracted more debate than any other intensive husbandry system. Conventional cages for laying hens have been criticised on the grounds that: i) in the absence of litter, hens are unable to express normal dust-bathing and foraging behaviour; ii) in the absence of a nest, nesting motivation is frustrated; iii) restriction of movement within a cage causes frustration and prevents normal bone development; which (iv) is exacerbated by the absence of a perch for roosting (Baxter 1994). This concern for welfare has contributed to pressure on legislative systems in different regions of the world and has included banning conventional cages. However, conventional cages also have positive effects on welfare in that they provide a relatively hygienic environment, good environmental control and a small group size (Duncan 2001).

Welfare concerns the attempts of the animal to cope with its environment and generally focuses on the behaviour, physical condition and physiology of the animal (Broom 1986). One major difficulty in reaching a scientific consensus on the ability of conventional cages to ensure appropriate levels of hen welfare is in determining what welfare indicators are used and how they are interpreted. Researchers have previously considered that taking a wide and diverse range of variables is the best way of assessing welfare (eg Craig & Adams 1984), though more recently the limitations of this approach have been considered (eg Nicol et al 2011). The ability to perform specific behaviours, absence of unwanted behaviours, specific physiological responses and health measures, physical condition and injuries and production parameters have all been recorded and considered in assessing welfare of hens in cages in multiple experiments, and form the basis of many qualitative reviews (eg Appleby & Hughes 1991; Hester 2005; Rodenburg et al 2008; Lay et al 2011).

Qualitative review of the literature is a fundamental scientific activity which reduces large quantities of information into palatable pieces, is efficient in avoiding the need for a further study and can lead to the generalisation of scientific findings. Reviews on hen welfare in different housing systems have originated in various continents and by different authors and have generally required making value judgements based on the subjective evaluation and assess-